APPLIED DATA SCIENCE -1

ASSIGNMENT - 1 : STATISTICS AND TRENDS

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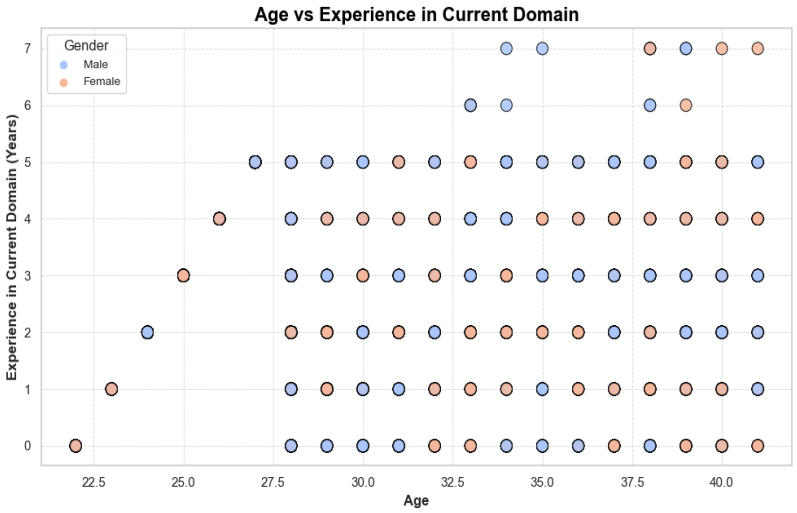
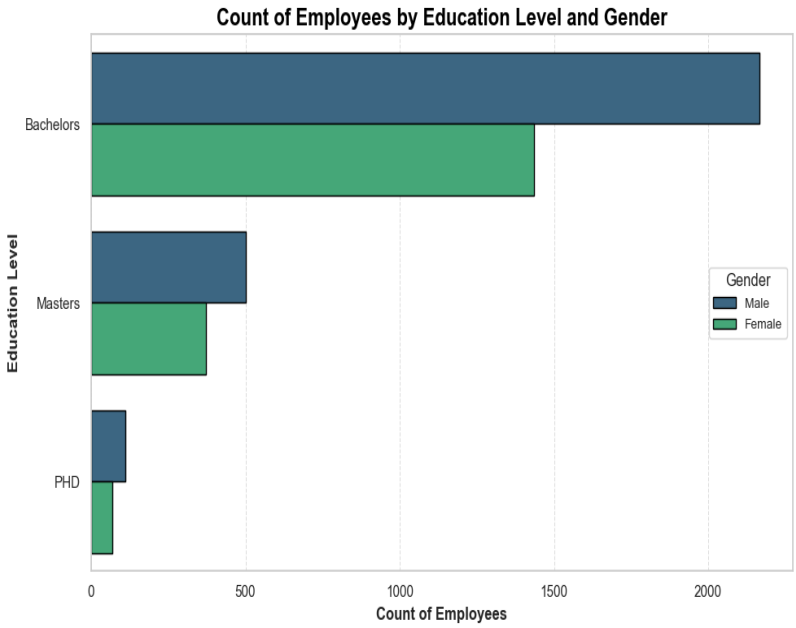
Github link: https://github.com/Pavithiraseenivasagan/Statistics-and-Trends
Dataset link:
https://www.kaggle.com/datasets/tawfikelmetwally/employee-dataset?resource=download

Abstract
This report examines the composition and dynamics of an organization's workforce by analysing key attributes such as age, experience, education, and compensation. Through data visualization and statistical analysis, we uncover insights into the relationships between these variables, highlighting patterns that can inform workforce planning and policy-making. Our analysis reveals a young, diverse team with a variety of educational backgrounds, significant gender representation, and moderate levels of experience. This narrative will guide us in understanding the workforce structure, trends in pay equity and potential areas for development and retention.

Building a Dynamic Workforce: Insights into Growth, Equity and Development

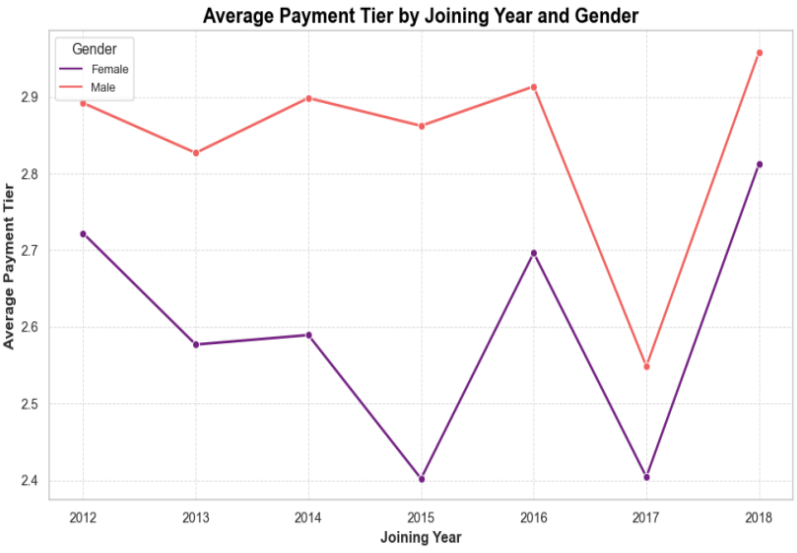
The scatter plot of "Age vs. Experience in Current Domain" reveals a young workforce, with most employees aged 22 to 30 having around 2 to 4 years of experience. This suggests many are in the early stages of their careers, building expertise. As employees age, experience generally increases, with those over 30 often reaching 5 to 7 years. The chart also highlights gender representation, with both men and women across experience levels, though slightly more men appear at higher experience levels. This may indicate differences in career progression and suggests opportunities for tailored retention and development programs.

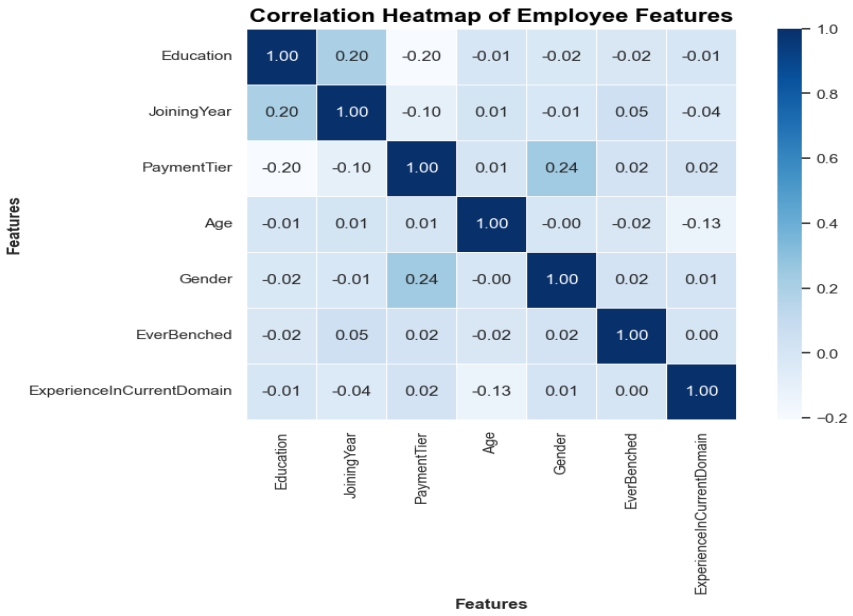




The next visualization, a horizontal bar chart titled "Count of Employees by Education Level and Gender," paints a clear picture of the educational landscape within the workforce. Most employees hold a bachelor's degree, making it the most common qualification across both genders. The number of master's and PhD holders is smaller, indicating that while higher education is valued, it is less prevalent. Gender differences in education are also evident. At each level, men slightly outnumber women, particularly at the bachelor's level. This pattern suggests opportunities for the organization to encourage and support higher educational attainment, potentially through incentives for advanced education, to ensure a balanced representation across educational levels.

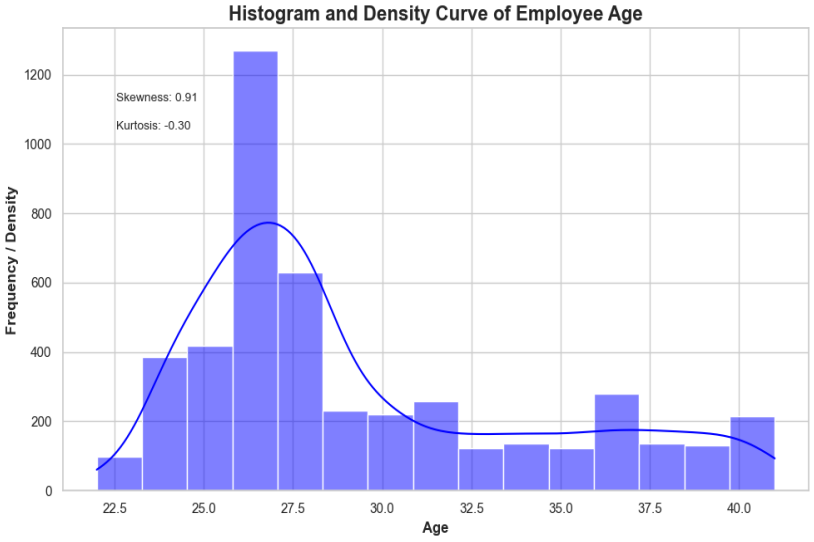
The line plot on "Average Payment Tier by Joining Year and Gender" gives us a glimpse into salary trends over the years. Generally, male employees have a slightly higher average payment tier than female employees, though the gap is minor and varies. Around 2015 and 2017, there are noticeable dips in pay for both genders, which may reflect times of organizational change or broader economic shifts. In recent years, however, we see these payment tiers moving closer together, a promising sign of progress toward pay equity. This trend suggests the organization's dedication to fair compensation, with evolving HR policies likely contributing to closing any gaps.





The correlation heat map reveals intriguing connections between employee attributes and compensation. For example, higher education doesn't always equate to higher pay experience or specific skills may be more influential. There's also a slight trend of men earning a bit more, pointing to potential areas for continued progress in pay equity. Additionally, older employees tend to have more varied career paths, while younger employees often stay longer in their initial roles. These patterns, though subtle, shed light on how education, experience, and gender uniquely influence career progression and compensation in the organization.

The age distribution histogram, with its peak around ages 25-27, shows that the organization has a young team, mostly in their mid-20s. The slight skew toward younger ages suggests a strong presence of early-career professionals, while the fewer employees at older ages create a lighter tail on the distribution. This youthful age profile indicates that the organization could benefit from focused career development and mentorship programs to support and retain these employees. Overall, it's a dynamic, growing team with great potential for long-term development and contribution to the company's future.



The statistical summary provides concrete numbers that back up our observations. Most employees joined around 2015, with new recruits as recent as 2018, showing steady workforce growth. Payment tiers are concentrated in the mid-level range, with a slight skew toward lower tiers, likely reflecting the team's early career stage. The average age of 29 aligns with the young workforce, and an average of 2.9 years in their current roles suggests frequent transitions within the organization. These metrics reinforce the trends we've observed, offering a solid foundation for understanding the organization's evolving workforce.

Conclusion

This analysis reveals a young, ambitious workforce, primarily early in their careers and growing within their roles. While gender representation is balanced, slight differences in pay and experience suggest opportunities to enhance equity and retention. Most employees hold bachelor's degrees, with room for further educational support. The findings indicate that experience and skills often impact compensation more than education alone, suggesting policies could focus on career growth through performance. This analysis provides guidance for HR to support young professionals, address pay equity, and encourage continuous learning—strengthening a dynamic team ready to drive future success.